

Attendance Problems: Solve each equation.

1. $-5a = 30$

2. $-\frac{2}{5}x = 4$

3. $\frac{y}{-5} = \frac{-3}{8}$

4. $-\frac{3}{4}x = \frac{6}{11}$

Graph each inequality.

5. $x \geq -10$

6. $x < -3$

- I can solve one-step inequalities by using multiplication.
- I can solve one-step inequalities by using division.

Common Core

CC.9-12.A.CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions. *

CC.9-12.A.REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

Properties of Inequality

Multiplication and Division by Positive Numbers

WORDS	NUMBERS	ALGEBRA
Multiplication You can multiply both sides of an inequality by the same <i>positive</i> number, and the statement will still be true.	$7 < 12$ $7(3) < 12(3)$ $21 < 36$	If $a < b$ and $c > 0$, then $a\textcolor{red}{c} < b\textcolor{red}{c}$.
Division You can divide both sides of an inequality by the same <i>positive</i> number, and the statement will still be true.	$15 < 35$ $\frac{15}{\textcolor{red}{5}} < \frac{35}{\textcolor{red}{5}}$ $3 < 7$	If $a < b$ and $c > 0$, then $\frac{a}{\textcolor{red}{c}} < \frac{b}{\textcolor{red}{c}}$.

These properties are also true for inequalities that use the symbols $>$, \geq , and \leq .

Video Example 1. Solve the inequality and graph the solutions.

A. $5x < -20$

B. $0.5 \geq \frac{y}{4}$

C. $\frac{5}{2}x > -5$

1 Multiplying or Dividing by a Positive Number

Solve each inequality and graph the solutions.

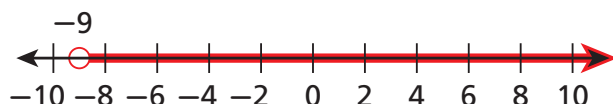
A $3x > -27$

$$3x > -27$$

Since x is multiplied by 3, divide both sides by 3 to undo the multiplication.

$$\frac{3x}{3} > \frac{-27}{3}$$

$$x > -9$$



Solve each inequality and graph the solutions.

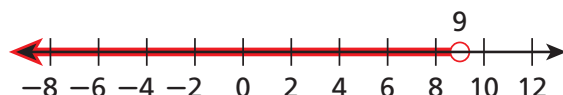
B $\frac{2}{3}r < 6$

$$\frac{2}{3}r < 6$$

Since r is multiplied by $\frac{2}{3}$, multiply both sides by the reciprocal of $\frac{2}{3}$.

$$\frac{3}{2}\left(\frac{2}{3}r\right) < \frac{3}{2}(6)$$

$$r < 9$$



Example 1. Solve the inequality and graph the solutions.

A. $7x > -42$

B. $2.4 \leq \frac{m}{3}$

C. $\frac{3}{4}r < 12$

Guided Practice: Solve the inequality and graph the solutions.

7. $4k > 24$

8. $-50 \geq 5q$

9. $\frac{3}{4}g > 27$

Fill in the blanks with $<$ or $>$.

10. -1 _____ -3

11. 1 _____ 3

12. 8 _____ -6

13. -8 _____ 6

14. -5 _____ -7

14. 5 _____ 7

15. What happens to an inequality when you multiply both side by a negative number?

Caution!

Do not change the direction of the inequality symbol just because you see a negative sign. For example, you do not change the symbol when solving $4x < -24$.

Video Example 2. Solve the inequality and graph the solutions.

A. $-4x < 12$

B. $-1 \geq \frac{w}{-4}$

2**Multiplying or Dividing by a Negative Number**

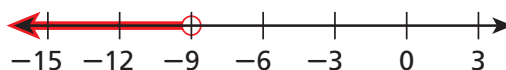
Solve each inequality and graph the solutions.

A $-8x > 72$

$$\frac{-8x}{-8} < \frac{72}{-8}$$

$$x < -9$$

Since x is multiplied by -8 , divide both sides by -8 .
Change $>$ to $<$.

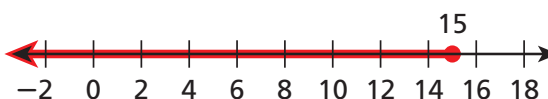


B $-3 \leq \frac{x}{-5}$

$$-5(-3) \geq -5\left(\frac{x}{-5}\right)$$

$$15 \geq x \text{ (or } x \leq 15)$$

Since x is divided by -5 , multiply both sides by -5 .
Change \leq to \geq .

**Example 2.** Solve the inequality and graph the solutions.

A. $-12x > 84$

B. $-8 \leq \frac{x}{-3}$

Guided Practice. Solve the inequality and graph the solutions.

16. $10 \geq -x$

17. $4.25 > -0.25h$

Video Example 3. Angela has \$25 gift certificate to a movie rental web site where a movies costs \$4.50, including tax. What are possible numbers of movies that Angela can rent and pay for with the gift certificate?

EXAMPLE 3 Consumer Application

Ryan has a \$16 gift card for a health store where a smoothie costs \$2.50 with tax. What are the possible numbers of smoothies that Ryan can buy?

Let s represent the number of smoothies Ryan can buy.

\$2.50	times	number of smoothies	is at most	\$16.00.
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2.50	•	s	\leq	16.00
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$$2.50s \leq 16.00$$

$$\frac{2.50s}{2.50} \leq \frac{16.00}{2.50}$$

$$s \leq 6.4$$

Since s is multiplied by 2.50, divide both sides by 2.50. The symbol does not change.

Ryan can buy only a whole number of smoothies.

Ryan can buy 0, 1, 2, 3, 4, 5, or 6 smoothies.

Example 3. Jill has a \$20 gift card to an art supply store where 4 oz tubes of paint are \$4.30 each after tax. What are the possible numbers of tubes that Jill can buy?



18. Guided Practice: A pitcher holds 128 ounces of juice. What are the possible numbers of 10-ounce servings that one pitcher can fill?

2-3 Assignment: (pp 115-116) 27, 29, 39, 41, 42, 50, 54-60, 62-64, 66.

